> services authorized in the band and enhancing the efficient use of the spectrum.
>
> -- Letter Ruling dated June 5, 1992 from R.A. Haller to J.B. Richards, at 2.

Some commenters express concern that allowing identification operators to use 300 watt transmitters throughout the band allocations might interfere with Part 15 operations. (See NPRM ¶ 30).[74] Most identification system providers do not advocate use of 300 watt transmitters. Hughes supports a limit of 30 watts at an antenna height of 15 meters, and lower powers for taller antennas.[75] Other narrowband operators propose limits of 30 watts,[76] 20 watts,[77] and 1 mV/m at 3000 m.[78]

Existing and proposed LMS system operations should thus not have an appreciable adverse effect on Part 15 operators, with one possible exception. Despite the Commission's proposal to decrease wideband pulse-ranging forward link power to 300 watts and to limit the links to specified frequencies, Pinpoint seeks to operate base stations (Pinpoint's forward link) up to 5000

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[74] See Telxon Comments at 6; Symbol Technologies Comments at 6; Itron/EnScan Comments at 6; Ericcson Comments at 7.

[75] Comments of Hughes Corp. at 9. Hughes also produces the devices discussed by the California Air Resources Board at 2; we doubt Hughes would employ identification technology which interferes with its own Part 15 devices.

[76] Amtech Comments at 18.

[77] Saab-Scania Comments at 18.

[78] Mark IV Comments at 13.

watts ERP throughout the 902-928 MHz band.[79] Such operations could have an adverse effect on Part 15 devices, but such problems can be avoided if the Commission simply adopts its proposed rule and limits wideband pulse-ranging forward links to 300 watts.

D. Co-Channel Separation Of Wideband Pulse-Ranging LMS Systems Will Benefit Part 15 Users

To the extent wideband pulse-ranging LMS systems may cause interference to Part 15 devices, Part 15 users will benefit from co-channel separation of wideband pulse-ranging LMS systems. If there is any chance of interference to Part 15 users, it would come from the forward links of wideband pulse-ranging LMS systems that are located near to Part 15 devices. Under the proposed rules, these forward link transmitters may employ power levels of up to 300 watts, and these power levels are needed in order to assure that the mobile radiolocation units can reliably receive the proper instructions to send out a wideband pulse. A single wideband pulse-ranging LMS operator might typically employ about five to ten forward link transmitters in a city.

If there is no co-channel separation, then there may be several wideband pulse-ranging LMS operators on each of the two wideband channel allocations. Considering only the 904-912 MHz channel, for example, there might be several wideband pulse-ranging licensees who construct and operate systems. If each operator constructs only five forward link transmitters, this

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[79] Pinpoint Comments at 29, 32.

increase in the number of transmitters would substantially increase the likelihood of interference into nearby Part 15 devices, because it would distribute the forward link transmitters more widely around the city.[80] Conversely, having only a single licensee on each wideband pulse-ranging channel would increase the likelihood that any particular Part 15 device would be able to avoid interference.

Additionally, the multiple wideband pulse-ranging operators can be expected to fight interference between their systems by increasing the power on their forward links and adding more transmitter sites. While this might improve performance against co-channel interference into wideband pulse-ranging, it would increase interference into Part 15 devices.

The AVM service exists today without causing interference into Part 15 devices. Part 15 devices will be best protected from harmful interference in the future if the Commission limits wideband pulse-ranging forward link power to 300 watts, and if it avoids the power-war scenario that would occur if multiple wideband pulse-ranging operators were licensed in each wideband channel in each city.

---

[80] If the several wideband pulse-ranging operators were to arrange a time-sharing arrangement for the use of the channel, then this would decrease the amount of time that each forward link transmitter were used. But any interference whatsoever might be intolerable for certain kinds of Part 15 products, such as wireless PBXs and cordless telephones. The smaller the number of forward link locations, the more readily those products could be configured to avoid interference from wideband pulse-ranging forward links.

CONCLUSION

LMS promises to be an innovative service with a variety of new and useful applications. Teletrac continues to support permanent realistic rules that permit LMS service to thrive rather than stagnate. Accordingly, we strongly urge the Commission to act favorably on the recommendations we have presented.

Respectfully submitted,

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& ROUVELAS MEEDS
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By: Stanley M. Gorinson (ex)
Stanley M. Gorinson

Counsel for North American
Teletrac and Location
Technologies, Inc.

Dated: July 29, 1993

ANDREWS OFFICE PRODUCTS CAPITOL HEIGHTS, MD (K)

Telephone Week

Exclusive reporting on BOC and independent telco activities worldwide

Merging ***BOC Week*** and ***Independent Telco News***

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Vol. 10, No. 15 April 12, 1993

TCI Discloses Ambitious Deployment Plans For State-Of-The-Art Fiber-Optic Network

Tele-Communications Inc. today (April 12) will announce plans to build a nationwide fiber-optic superhighway to be completed within four years, a company official said last week.

TCI Operations' Chief Operating Officer Barry Marshall said his company is "very much committed " to the program and is enthusiastic that TCI is building a state of the art system "faster and better than anyone else."

Marshall was unable to pinpoint the cost of the project which involves 7,000 miles of lines but described it as multibillion dollar undertaking. "That's the closest we can get," he said of the figure, citing that expenses will be spread over several years. "The good news is that technology is getting cheaper."

The project will reach major markets such as Miami, Chicago and Washington, D.C. initially but will eventually extend to areas with as few as 2500 homes.

CableLabs' spokesman Mike Schwartz calls the fiber-optic network a great vehicle for cable operators since it will allow companies to improve reliability and signal quality, cut down on maintenance costs and increase channel capacity.

Marshall said that TCI hopes to offer a 500 channel service by 1994.

The network will also provide the customer with a "terrific opportunity," Schwartz added, giving viewers more control over programming as well as interactive capabilities.

The FCC's adoption last week of rules that could cut cable TV prices by at least 10 percent doesn't appear to be an obstacle for TCI as the company has scheduled a news conference for Monday to officially announce its plans to build the fiber-optic network.

"The future lies in new opportunity," Schwartz said.

(Continued)

requirement to come up with innovative applications that would be used by future users.

A spokesman for Pac Bell said that the company expects to invest more than $35 million in the construction of the network, but the full cost of the project will be paid by commercial users and through funding by the non-profit organization.

Pac Bell did not disclose the names of the cable companies that will participate in the telco/cable collaboration test., Pac Bell did not disclose the names of the cable companies that will be involved. But the company conceded the importance of such an alliance for the contribution each technology makes – cable's high resolution for image transmission, and

Houston, Los Angeles and Miami. Teletrac's next destination will be New York, although Black declines to say exactly when service will be offered.

Two-way text messaging in the six markets won't be available until the fall because Teletrac has to modify its network to accommodate the service.

The More The Merrier

Qualcomm, which sells its satellite-based OmniTracs AVL and messaging service to the trucking industry, views Pactel's service as positive for their business segment. "It raises market awareness," Qualcomm spokesman Philip Jenquin said.

Jenquin noted that Teletrac is not viewed as a "significant competitive threat" as OmniTracs caters to a nationwide market while Teletrac serves particular metropolitan area.

Despite Stargardt's enthusiasm, he claims that Pactel's system won't necessarily be affordable to smaller companies and is somewhat limited since it only serves six cities. "The bulk of the market needs lower prices," he said.

Stargardt said his company will eventually provide better service to a larger market at a cheaper price. He attributes this to the structure of Pinpoint's system saying the design of [illegible]

company. This device is connected via a cable to the Coded terminal's serial port.

The host-based messaging software, which runs on an IBM-compatible PC, costs $2,000. In addition to sending and receiving messages, the software allows the dispatcher to display the location of vehicles across the coverage area. The dispatcher can also "zoom" in on a single vehicle to determine its location to within 150 feet.

The airtime charges will average slightly less than $30 per month per vehicle, Black estimates. Included in the charge is the AVL service from the vehicle. When the Coded terminal is turned on or a message is sent, it automatically transmits the vehicle's identification number, status and position. That initial log-on message saves about 20 seconds of voice airtime, Black says.

Reducing Airtime Costs

Airtime savings is one of the advantages Teletrac will promote. Fleet Director is targeted at many companies that already use voice radios and is designed to reduce their airtime costs, he says. "We spent a lot of time asking customers what they want and what they'll pay for," Black says. Reducing airtime costs on their existing radio [illegible]

To save the cost of a leased line, Fleet Director subscribers access the Teletrac network via a regular dial-up line.

Teletrac has high hopes for Fleet Director. AVL is too esoteric for most corporations, but wireless data is more easily understood.

There's no doubt wireless messaging is typically the "steak" for corporations while vehicle location is the "sizzle." Indeed, Qualcomm, has found that to be the case.

(Geostar, which offered similar satellite AVL/messaging services, also discovered messaging was the easier sell. Geostar ceased operations in 1991.)

Teletrac will have to be somewhat careful about how it promotes the messaging service aspect of its business. Its FCC license is for AVL services with related in-vehicle services designated as secondary offerings. As a result, Teletrac subscribers will *always* get AVL service, regardless of what else is provided, Black says.

(Other companies with the same type of license, such as Pinpoint , face these same limitations.)

– Alan Reiter and Paul Rubin

U S West Plans $10 Million PCS Trial In Boise, Idaho

Whether visiting the local shopping mall, watching television at home or taking a trip to the office vending machine, a person will soon be within reach via a single communications device that will be available to some of Boise, Idaho's 120,000 residents next year.

U S West announced plans March 30 to launch a $10 million program in 1994 which the company said is expected to be one of the largest personal communications services (PCS) trials in the country.

U S West spokeswoman Susan Shepard said the system will allow people to "stay in touch" all the time.

About 1,000 Boise residents will use Ericsson DCT1900 handsets to place and

further our understanding of usage in and between these three basic environments: public, home and business," said Stephen Boyd, vice president of U S West's personal communications development group.

"The trial will also provide valuable information about the technical and practical aspects of designing, deploying and operating a true low-power microcellular system," Boyd said. "In addition, U S West will gain experience using an existing infrastructure to support new wireless services."

U S West said that the handset will work like a cordless phone at home and can be used in Boise's downtown

Analysis of Interference from Pinpoint into Amtech Under Pinpoint's Proposed Power Limits

July 27, 1993

Dr. Charles L. Jackson

Table of Contents

I. Introduction

In their Comments in PR Docket No. 93-61, two parties, Pinpoint and Amtech, supported similar technical standards and claimed that their systems could share spectrum in the 902-928 MHz band. While these comments supported similar policy outcomes, they presented substantially different information on the interference susceptibility of Amtech tag-reader systems. Examination of other sources and communications engineering considerations omitted in the Pinpoint and Amtech comments indicate that Amtech's statements on the interference susceptibility of their equipment apprear to be more accurate. Applying traditional interference calculations, one discovers that if a Pinpoint base-station were to operate under the rules proposed by Pinpoint and according to the procedures set forth by Pinpoint, nearby Amtech tag readers will be rendered inoperable. Based upon this analysis, I conclude that the interference analysis offered by Pinpoint and Amtech appears to be flawed.

The analysis below proceeds in three steps:

- identify assertions in Pinpoint and Amtech comments
- calculate interference levels based upon data in comments
- offer analysis of interference potential.

II. Facts and Assumptions Used in Analysis

The data used in the analysis and the source for that data include:

- Proposed power level for a Pinpoint base station transmission
  625 watts/MHz or 5,000 watts/8 MHz
  Pinpoint Comments at 32
  Amtech Comments at 18

- Placement of Pinpoint's transmitters
  1000-3000 feet from tag reader
  "...field measurements by Pinpoint have shown that there is little likelihood that they will suffer undue interference from relatively high-powered, wide-area base stations, suitable placed in relation to them (1000 to 3000 feet away, on structures from 100 to 300 feet high)."
  Pinpoint at 29

  "the base station power levels will need to be able to operate up to 5 kilowatt ERP in order to be able to ensure that the mobiles will be able to receive the base signals while near to local-area system noise/jamming sources"
  Pinpoint at 29

One-mile spacing between wide-band pulse-ranging base-stations in urban areas, five-mile spacing elsewhere:

"Base stations are typically separated by between 4 and 8 miles in suburban areas, and may be as close as a mile apart in urban areas."
Pinpoint at 7

"A similar result [reduction of interference] could be achieved through the strategic situating of fixed receivers."
Amtech at 21

- Pinpoint assertion on tag-reader receive levels (-10 to -20 dBM)

"Since the local-area systems are generally relatively short range, and operate with relatively high (receive) signals levels (typically -10 to -20 dBm) resulting from ..."
Pinpoint at 29

- Amtech assertion on power reflected from tags (300 microwatts)

"...typical tag reflects less than 300 microwatts"
Amtech at 8, footnote 16

- Amtech assertion on power levels

"In a typical installation under the current rules, this signal [tag-reader] is transmitted at approximately 2 watts effective radiated power (ERP) or less."
Amtech at 8

- Amtech assertion on receiver bandwidth (800 kHz)

". . . the necessary bandwidth is about 800 kHz in systems currently deployed"
Amtech at 8 and again at A-4

- Amtech statement that the American Trucking Association (ATA) standard is "compatible" with Amtech technology.

"The [ATA] standard is compatible with the AMTECH equipment, and is also compatible with the rail standards approved by AAR . . ."
Amtech at A-12

- ATA standard of 130 kHz receiver bandwidth.

"Receiver bandwidth 130 kHz"
ATA Standard, May 16, 1990, p7,
Enclosure with ATA Comments

- ATA standard for signal levels reflected from tags

"When a properly presented Tag is excited as indicated by an incident wave at a given reference range, it shall respond within the following modulated return signal strength, exclusive of carrier and as measured at the same reference range:

	Frequency	Reference	Test	RMS Signal Strength (Microvolts/m)	
Tag Type	(MHz)	Range	Conditions	Minimum	Maximum
General	902-928	10 m	EIRP=1W	1,400	4,100

ATA Standard, May 16, 1990, p9
Enclosure with ATA Comments

III. Analysis of Interference from Pinpoint into Amtech

A. Introduction

The analysis below calculates the predicted level of interfering signal from a Pinpoint system at a tag reader site and compares that signal level with the signal level from a tag. I consider three main scenarios. In the first, I assume that the reflected energy from the tag is at the level claimed by Amtech as representative, and that the interfering base station is 300 meters (984 feet) away, and I calculate the tag-to-reader range at which the received signal from the tag would exceed the interfering signal. Second, keeping our previous assumptions but recognizing that the reflected energy from the tag will increase as the tag moves closer to the reader, I calculate the tag-to-reader range at which the received signal from the tag would exceed the interfering signal. Third, I assume that the Pinpoint base station is more distant -- at distances that would be typical in urban areas if Pinpoint made no effort to locate its base stations close to AVI reader stations.

The heart of the analysis can be seen in simple calculations. If the Amtech receiver has a 800 kHz bandwidth and the Pinpoint system transmits a noise-like signal with 625 watts of power spread over each megahertz, then it transmits $0.8*625=500$ watts in the tag-reader's receiver bandwidth. If the tag reflects 300 microwatts, then the interfering power is 1,666,666 times stronger than the power of the desired signal. If there is free-space propagation on both paths, then the tag must be $\sqrt{1,666,667}=1291$ times closer to the reader than is the Pinpoint base-station for the signals to be of equal strength. If the interference source is 300 meters away, then the tag needs to be less than a quarter of a meter (about ten inches) from the reader. If the interference source is five miles away, then tag needs to be six meters or less from the reader for the signal levels to be equal.

Another way to look at this is to consider the maximum reflected signal level under the ATA standard (4,100 microvolts per meter) and ask how far away a 500 watt transmitter must be in order for its signal level to fall to 4,100 microvolts per meter. The electric field strength, E, from a transmitter of p watts at distance d meters is

$$E = \frac{\sqrt{30p}}{d}$$

For a 500 watt source, the field strength falls to 4,100 microvolts per meter at 30 kilometers (about 20 miles) from the transmitter under free-space propagation.

Each of these simple calculations shows that a Pinpoint base station, even a transmitter located miles away from an Amtech tag reader, poses an interference threat. Based upon these simple calculations alone, it would seem prudent for the FCC to be skeptical of the claims by Pinpoint and Amtech that their technologies can operate cochannel stations with little separation and be cautious about basing any regulatory decision on that unsubstantiated claim.

Also note that Pinpoint's claims for the received power levels in tag reader systems do not match with the claims by Amtech or with the ATA specification. Pinpoint claims a receive

antenna, an thus an inverse square law is appropriate for predicting the strength of the unwanted signal.

Tag-reader antenna directivity should not have a significant impact on interference rejection. Amtech installations use antennas of moderate directivity. The interfering signal would be scattered by objects in the field of view of the antenna. Additionally, Amtech antennas are sometimes mounted to the side of the route rather than above it and could easily have a direct path to the interfering transmitter's antenna. Because of these factors, the analysis below does not assume any interference rejection from antenna directivity. The analysis does, however, include any effects of antenna gain on the strength of the tag-reader signal illuminating the tag.

Judging the interference rejection capabilities of the Amtech receiver is harder. Because of the Amtech tag's short range operation and its relatively high power for such a short range, and the fact that the reflected signal falls off with the fourth power of distance from the reader, additional protection against noise offers little improvement in system performance. A 3 dB decrease in required signal-to-noise ratio would only increase tag reader range about 20 percent, assuming that reception was purely noise limited and that noise, rather than the ability to power the tag with the incident RF signal, limited performance. I judge that a signal-to-noise ratio in the range six to ten dB is likely to be required for proper functioning of an Amtech tag reader. I will use the lower end of this range as a conservative estimate of the performance of the Amtech receiver. Many communications systems are engineered with substantial margins (up to 30 dB) to allow for the effects of infrequent events on the propagation path. The analysis below assumes that the Amtech system needs no such

Tag reader receiver bandwidth of 800 kHz,
Free space propagation between the Pinpoint system and the tag-reader, and
A required signal-to-noise ratio at the tag-reader of 6 dB.

Under these assumptions, the tag must be 0.1165 meters (about four inches) or less from the reader in order to be read. The received signal level from the tag at an isotropic receive antenna would be -18 dBm, and the interfering signal level would be -24 dBm.

2. Scenario Two

The first scenario assumes that the reflected power from the tag stays constant as the tag moves closer to the reader. That may be unrealistic if the tag is within inches of the transmitter. To the extent that the tag behaves like a radar target, the reflected signal strength should obey the radar equation and be proportional to the fourth power of the distance to the tag. The ATA technical specification gives the numbers needed to make calculations using the radar equation. The ATA requires that a tag illuminated by a 1 watt transmitter return a signal field lying in the range 1,400 to 4,100 microvolts per meter. (63 dBu to 72 dBu). Assume that the tag that performs at the average level of these two and returns a signal level of 67.6 dBu (2,400 microvolts per meter) -- the arithmetic mean of the field strength in dB or the harmonic mean of the field strength in volts/meter. The received signal strength can then be predicted as a function of the separation between the tag and the reader and the effective radiated power transmitted by the tag reader. In particular, the received signal strength is proportional to the square root of the tag-reader power and is inversely proportional to the fourth power of the separation between the tag and the reader.

If one assumes the following:

Pinpoint transmitter located 300 meters from tag reader installation,
Pinpoint transmitter operates at 625 watts/MHz,
Tag reflects 2,400 microvolts/meter when illuminated by a 1 watt source at ten meters,
The tag reader operates at an EIRP of 30 watts,
Reflected power follows the radar equation,
Tag reader receiver bandwidth of 800 kHz,
Free space propagation between the Pinpoint system and the tag-reader, and
A required signal-to-noise ratio at the tag-reader of 6 dB.

then the tag must be about 1.3 meters (1.27 actually) or less from the reader in order to be read. This is quite a close distance. It requires tags to be carefully positioned on vehicles and vehicles to pass quite close to the tag-reader. The received signal level from the tag at an isotropic receive antenna would be -18 dBm, and the interfering signal level would be -24 dBm. A tag at the ATA specification test distance (ten meters) would reflect a signal with a desired to undesired ratio of -30 dB, which would be unusable.

This analysis was done using the bandwidth Amtech claims for its receivers. If we shrink the bandwidth from 800 kHz (Amtech statement) to 130 kHz (ATA standard), the interfering energy is reduced by (800/130) or about 8 dB. Consequently, reader-to-tag range rises from 1.3 meters to 2 meters. Thus, the conclusions of this analysis are not strongly sensitive to the tag-reader bandwidth. For the purposes of this analysis it matters little whether we believe that the ATA specification or Amtech's comments more correctly describe the performance of tag-reader systems in the field.

In this case I calculated performance at the highest power that Amtech has indicated needs be permitted for a tag reader system. Note that the region within 0.63 meters (two feet) of an isotropic 30 watt radiator has a power density exceeding 0.608 mW/cm^2 -- the ANSI maximum permissible exposure for uncontrolled environments evaluated at 912 MHz. See ANSI IEEE C95.1-1991, IEEE April 27, 1992, Table 2, page 15. This raises the question of whether tag readers operating at such high levels should be deployed without consideration of environmental effects. Given the rapid fall off in service range predicted by the radar equation, additional power will not significantly increase the performance of the tag-reader. For example, if tag reader power is increased to 300 watts, reader-to-tag range only grows to 2.26 meters, but the range to the 0.608 mW/cm^2 boundary increases to 2 meters.

3. Scenario Three

SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-K

[redacted]
93 [redacted] 8117

(Mark One)

[X] ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the fiscal year ended December 31, 1992

[ ] TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

RECD S.E.C.
MAR 29 1993
1086 140

For the transition period from ..... to .....

Commission File Number: 0-17995

AMTECH CORPORATION

(Exact Name of Registrant as Specified in its Charter)

Texas	75-2216818
(State of Incorporation)	(I.R.S. Employer Identification Number)

17304 Preston Road
Building E-100
Dallas, Texas 75252
(Address of Principal Executive Offices)
(214) 733-6000
(Registrant's Telephone Number, Including Area Code)

SECURITIES REGISTERED PURSUANT TO SECTION 12(b) OF THE ACT:

None	Not Applicable
(Title of Class)	(Name of Exchange on Which Registered)

SECURITIES REGISTERED PURSUANT TO SECTION 12(g) OF THE ACT:
Common Stock
$0.01 Par Value
(Title of Class)

Indicate by check mark whether the Registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the Registrant was required to file such reports) and (2) has been subject to such filing requirements for the past 90 days.

Yes ✓ No _____

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. [ ]

As of March 9, 1993, there were 11,523,380 shares of Amtech Corporation $0.01 par value Common Stock issued and outstanding, 10,306,061 of which having an aggregate market value of $306,605,910 were held by non-affiliates. For purposes of the above statement, all directors and officers of the Registrant are presumed to be affiliates.

Portions of the Proxy Statement for the Registrant's 1993 Annual Meeting of Shareholders are incorporated by reference into Part III of this Form 10-K, and portions of the Registrant's 1992 Annual Report are incorporated by reference into Parts II and IV of this Form 10-K.

Page 1 of 60 sequentially numbered

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Item 2. Properties

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1ST STORY of Level 1 printed in FULL format.

THE DALLAS MORNING NEWS

July 16, 1993, Friday, HOME FINAL EDITION

SECTION: BUSINESS; Pg. 1D

LENGTH: 659 words

HEADLINE: Turnpike ends talks with Amtech group;
State agency, firms can't agree on toll system price

BYLINE: Tom Steinert-Threlkeld, Staff Writer of The Dallas Morning News

BODY:

The Texas Turnpike Authority has stopped negotiating with Motorola Inc. and Amtech Corp. for the installation of a new electronic toll collection and video enforcement system on the Dallas North Tollway.

The state agency broke off negotiations with the Motorola-Amtech team because "we couldn't come to agreement on price,' said Jerry Shelton, the authority's director of administration.

The agency instead will try to negotiate a contract with Cubic Toll Systems Inc., the company responsible for the coin-basket system used primarily on the tollway. Mr. Shelton said negotiations with Cubic began this week.

The original choice of Motorola Inc. as the main contractor for installing the new system had been challenged by Cubic, which questioned the selection because of Motorola's lack of experience in the installation of toll collection systems.

The Motorola-Amtech bid is an outgrowth of an alliance the two companies formed last August to pool electronics expertise in the pursuit of new toll collection business. Amtech pioneered the use of radio frequencies and computers as a means of electronically collecting tolls from moving vehicles. The Dallas North Tollway was its first installation of its electronic toll tag system.

At various points in the last year, competitors have called Amtech's system potentially flawed and inefficient in collecting tolls.

But the authority has maintained that Amtech's system works effectively, and Mr. Shelton said the failure to negotiate a deal for the more complex system had nothing to do with any fears about the quality of the system that the Motorola and Amtech team would provide.

Lawrence Moore, manager of public affairs for Motorola's government electronics group in Scottsdale, Ariz., said, "it's not really appropriate for us to comment on that.'

"There is absolutely no effect on Amtech,' other than lost business, said director of investor relations Virginia Cleveland.